



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/982,964	10/22/2001	Shin Nakamura	011361	8556

38834 7590 01/26/2005

WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP
1250 CONNECTICUT AVENUE, NW
SUITE 700
WASHINGTON, DC 20036

EXAMINER

BARTON, JEFFREY THOMAS

ART UNIT	PAPER NUMBER
----------	--------------

1753

DATE MAILED: 01/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/982,964

Applicant(s)

NAKAMURA ET AL.

Examiner

Jeffrey T. Barton

Art Unit

1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED. (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 November 2004.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3-5, 7-10 and 12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 3-5, 7-10 and 12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>20041116</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. The amendment filed on 16 November 2004 does not place the application in condition for allowance.

Status of Objections and Rejections Pending Since the Office Action of

16 June 2004

2. All objections and rejections of claims 1, 2, 6, and 11 are obviated due to cancellation of the claims.
3. The objections to the drawings, abstract, and claims 3 and 10 are withdrawn due to Applicants' amendment.
4. The rejection of claim 8 under 35 U.S.C. §112(2) is maintained.
5. The rejection of claims 9, 10, and 12 under 35 U.S.C. §112(2) is withdrawn due to Applicants' amendment.
6. The rejection of claim 10 under 35 U.S.C. §102(e) as anticipated by Adourian et al is withdrawn due to Applicants' amendment.
7. The rejection of claims 3 and 4 under 35 U.S.C §103(a) as obvious over Adourian et al and Smith et al is maintained.
8. The rejection of claim 5 under 35 U.S.C §103(a) as obvious over Adourian et al and Smith et al is withdrawn due to Applicants' amendment.
9. The rejection of claim 5 under 35 U.S.C §103(a) as obvious over Adourian et al, Smith et al, and Birnbaum et al is withdrawn due to Applicants' amendment.

10. The rejection of claim 7 under 35 U.S.C §103(a) as obvious over Adourian et al, Smith et al, Birnbaum et al, and Manian et al is withdrawn due to Applicants' amendment.
11. The rejection of claims 8 and 9 under 35 U.S.C §103(a) as obvious over Adourian et al, Smith et al, Birnbaum et al, and Uchigaki et al is withdrawn due to Applicants' amendment.
12. The rejection of claim 12 under 35 U.S.C §103(a) as obvious over Adourian et al and Menchen et al is maintained.
13. Additional rejections that were necessitated by Applicants' amendment are also presented below.

Claim Rejections - 35 USC § 112

14. Claim 8 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The language and construction of this claim renders it unclear. Using Applicants' amendment to claim 9 as an example, a suggested revision of the 3rd paragraph of the claim is: "the apparatus further comprises a control part which (a) causes the voltage applying part to supply a voltage for guiding a specimen to an intersection between the specimen injection passage and the separation passage, and (b) stops voltage application to said passages upon the specimen-injection monitor mechanism detecting a non-uniform specimen distribution in a predetermined area after a predetermined time has elapsed."

Claim Rejections - 35 USC § 103

15. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

16. Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Adourian et al in view of Smith et al.

Adourian et al disclose an electrophoretic apparatus that comprises: an electrophoretic member in which a disk shaped member thereof has a plurality of passages formed therein (Figures 10 and 11A, channels 152 and 194; Column 15, lines 14-41); holes reaching the passage formed at positions corresponding to both ends of the passage, on one surface of the disk-shaped member (Figure 11A, wells 190, 192, 194, 196; Column 15, lines 41-45; Figure 8A-C; Column 13, lines 24-32; Figure 7, openings 126 and 130); voltage applying parts for applying voltages across the passages of the electrophoretic member (Figure 7; Column 13, lines 14-19; Cathode and anode reservoirs in Figure 10; Column 15, lines 41-45); an electrophoretic member holding part for holding the electrophoretic member on the surface thereof (Figure 11, platter 191, microchips 120a and 120b; Figure 1, support assembly 24; Column 12, lines 21-33; Figure 5); a temperature regulation mechanism provided on the back surface of the holding part (Figure 6, heating element 142; Column 13, lines 4-13); an electrophoretic chamber lid for covering the surface of the electrophoretic member, the lid having an opening (Figure 6, upper housing member 124, opening 136); a detecting

part for detecting a specimen present in the passages of the electrophoretic member (Figure 11B, detector 202; Column 15, lines 56-61; Column 17, lines 22-33); wherein the detecting part consists of a fluorescent light-detecting device for detecting light in a detecting range (Column 17, lines 22-33; Column 18, lines 27-31)

Adourian et al do not explicitly disclose the use of a fluorescent light-detecting device comprising: a first optical system for focusing light from a detecting range into a slit hole for image formation, and a second optical system provided with a reflection-type diffraction grating, for separating the light from the slit hole and focusing the light onto a detecting element for image formation, nor do they disclose the detecting part being placed above the chamber lid. (Claim 3) Adourian et al also do not explicitly disclose the use of a second optical system consisting of only a concave reflection-type diffraction grating. (Claim 4)

Smith et al disclose a capillary electrophoresis apparatus that includes a fluorescent light-detecting device that comprises: a first optical system for focusing light from a detecting range into a slit hole for image formation (Column 7, line 1 – Column 8, line 8; Figure 1A shows all components); a second optical system provided with a reflection-type diffraction grating, for separating the light from the slit hole and focusing the light onto a detecting element for image formation (Figure 1A, slit 121, grating 120; Column 8, line 1 – 8); and the second optical system consisting of only a concave reflection-type diffraction grating (grating is only component between slit and detector, see Figure 1A; Column 8, lines 9-16)

Furthermore, the detection optics of Smith et al are designed for the light source and detector to be positioned on the same side of the separation lane that is monitored. (Figure 1a)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Adourian et al by replacing the light source and optics and light detector of their detector with the light source and optics and detector of Smith et al, because Smith et al teach the usefulness of this scanning detector in efficiently monitoring multiple separation lanes. (Column 2, line 64 - Column 3, line 9) This would lead to the positioning of the detector above the chamber lid.

In addition, it would have been obvious to position the detecting part above the electrophoretic chamber lid, as opposed to below, as shown by Adourian et al, because the isotropic nature of fluorescence emission allows placement of the detector at any position, making it a matter of design choice to a skilled artisan to select the most convenient position for the detector.

17. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Adourian et al in view of Smith et al, Burd, and Kambara.

Adourian et al disclose an electrophoretic apparatus that comprises: an electrophoretic member in which a disk shaped member thereof has a plurality of passages formed therein (Figures 10 and 11A, channels 152 and 194; Column 15, lines 14-41); holes reaching the passage formed at positions corresponding to both ends of the passage, on one surface of the disk-shaped member (Figure 11A, wells 190, 192,

194, 196; Column 15, lines 41-45; Figure 8A-C; Column 13, lines 24-32; Figure 7, openings 126 and 130); voltage applying parts for applying voltages across the passages of the electrophoretic member (Figure 7; Column 13, lines 14-19; Cathode and anode reservoirs in Figure 10; Column 15, lines 41-45); a detecting part for detecting a specimen present in the passages of the electrophoretic member (Figure 11B, detector 202; Column 15, lines 56-61; Column 17, lines 22-33); wherein the detecting part consists of a fluorescent light-detecting device for detecting light in a detecting range (Column 17, lines 22-33; Column 18, lines 27-31)

Adourian et al do not explicitly disclose a specimen-injection monitor mechanism for detecting a specimen at a site where a specimen is injected into the passage, wherein the mechanism is installed separately from the detecting part. Adourian et al also do not explicitly disclose the use of a fluorescent light-detecting device comprising: a first optical system for focusing light from a detecting range into a slit hole for image formation, and a second optical system provided with a reflection-type diffraction grating, for separating the light from the slit hole and focusing the light onto a detecting element for image formation.

Smith et al disclose a capillary electrophoresis apparatus that includes a fluorescent light-detecting device that comprises: a first optical system for focusing light from a detecting range into a slit hole for image formation (Column 7, line 1 – Column 8, line 8; Figure 1A shows all components); a second optical system provided with a

reflection-type diffraction grating, for separating the light from the slit hole and focusing the light onto a detecting element for image formation (Figure 1A, slit 121, grating 120; Column 8, line 1 – 8); and the second optical system consisting of only a concave reflection-type diffraction grating (grating is only component between slit and detector, see Figure 1A; Column 8, lines 9-16)

Burd discloses a capillary electrophoresis device that includes a sample-injection monitor detector (Figure 1, window 61) in addition to the downstream detector. (Window 60) (Column 4, line 59 - Column 5, line 22)

Kambara discloses splitting the beam of a light source in order to facilitate simultaneous detection at multiple sites in a capillary electrophoretic system while using a single source. (Figure 15; Column 31, lines 19-28)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Adourian et al by replacing the light source and optics of their detector with the light source and optics of Smith et al, because Smith et al teach the usefulness of this scanning detector in efficiently monitoring multiple separation lanes. (Column 2, line 64 - Column 3, line 9)

It would also have been obvious to one having ordinary skill in the art at the time of the invention to further modify the combination of Adourian et al and Smith et al by including a separately-installed detector for specimen-injection monitoring, as taught by Burd, because Burd teaches the usefulness of such an injection monitor in coordinating other functions of the apparatus. (Column 5, lines 6-22) Similar functions (i.e.

sequential injection, rotation of the device; Column 15, lines 51-56) are disclosed by Adourian et al.

It would also have been obvious to one having ordinary skill in the art at the time the invention was made to modify the combination of Adourian et al, Smith et al, and Burd by using a single light source with a beamsplitter for the plural detectors, as taught by Kambara, because it would simplify device operation and avoid variability in light source function.

18. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Adourian et al, Smith et al, Burd, and Kambara as applied to claim 5 above, and further in view of Manian.

Adourian et al, Smith et al, Burd, and Kambara disclose a combination as described above.

None among Adourian et al, Smith et al, Burd, and Kambara explicitly disclose a fluorescence detection system that uses an LED light source.

Manian et al disclose a fluorescence detector for use in capillary electrophoresis that uses an LED light source (Column 4, lines 62-66)

It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the combination of Adourian et al, Smith et al, Burd, and Kambara by using an LED light source for the detector, as taught by Manian et al, because it would be less expensive and more rugged than a laser.

19. Claims 8 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Adourian et al, Smith et al, Burd, and Kambara as applied to claim 5 above, and further in view of Uchigaki et al.

Adourian et al, Smith et al, Burd, and Kambara disclose devices as described above. Adourian et al further disclose a control part for permitting the voltage applying part to supply a voltage for guiding a specimen to an intersection between the specimen injection passage and the separation passage. (See Figure 8A-C) Burd also discloses using detected phenomena to actuate other functions of the device. (Column 5, lines 6-22)

None among Adourian et al, Smith et al, Burd, or Kambara explicitly disclose a control part that can immediately stop the apparatus in case of nonuniform specimen distribution (Claim 8) or failure to inject a sample from the specimen injection passage to the separation passage. (Claim 9)

Uchigaki et al disclose a liquid analysis device that includes means for shutting down an analysis in case a pipetting step (injection step) is not correctly carried out. (Column 12, lines 50-55) Detection of such a situation can be carried out by optical means (Column 8, line 54 – Column 9, line 2)

It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the combination of Adourian et al, Smith et al, Burd, and Kambara by creating a control program that would shut down the analysis if there was an injection irregularity detected at the injection site, as taught by Uchigaki et al, because it would increase efficiency by preventing time lost in unreliable analyses, and

because Burd suggest such automatic actuation based on phenomena detected by the injection monitor.

20. Claims 10 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Adourian et al and Menchen et al.

Adourian et al disclose an electrophoretic apparatus that comprises: an electrophoretic member in which a disk shaped member thereof has a plurality of passages formed therein (Figures 10 and 11A, channels 152 and 194; Column 15, lines 14-41); holes reaching the passage formed at positions corresponding to both ends of the passage, on one surface of the disk-shaped member (Figure 11A, wells 190, 192, 194, 196; Column 15, lines 41-45; Figure 8A-C; Column 13, lines 24-32; Figure 7, openings 126 and 130); voltage applying parts for applying voltages across the passages of the electrophoretic member (Figure 7; Column 13, lines 14-19; Cathode and anode reservoirs in Figure 10; Column 15, lines 41-45); a detecting part for detecting a specimen present in the passages of the electrophoretic member (Figure 11B, detector 202; Column 15, lines 56-61; Column 17, lines 22-33); an electrophoretic medium filling mechanism for filling the passages and reservoirs with an electrophoretic medium, through the reservoirs of the electrophoretic member (Column 10, lines 32-39; Column 21, lines 15-27 – both methods can fill reservoirs, and it might be unavoidable given the narrowness and geometry of the channels and the lack of disclosure of means to avoid reservoir-filling); a specimen injection mechanism for injecting a specimen into one of the reservoirs (Column 15, lines 43-45 and 51-56); a buffer-liquid injecting

mechanism for injecting buffer liquid into the reservoirs (Figure 4; Column 10, line 59 - Column 11, line 10; Column 21, lines 15-49); and a control part for controlling the electrophoretic apparatus, including the mechanisms, so that they all may operate automatically. (Figures 1 and 4, controllers 30 and 110)

The injection mechanism of Adourian et al, a multi-channel pipetting station 100 shown in Figure 4, is disclosed as being used for simultaneous injection of liquid into several reservoirs. (Column 11, lines 4-10) Regarding the liquid injected prior to sample loading (Column 11, lines 7-10), this would be buffer solution.

Relevant to claim 10, Adourian et al do not explicitly disclose an electrophoretic medium-sucking mechanism for removing electrophoretic medium contained in the reservoirs. Relevant to claim 12, Adourian et al do not explicitly disclose a specimen sucking mechanism for removing specimen left in the reservoirs after the specimen is injected into the passages.

Menchen et al disclose a capillary electrophoresis apparatus that includes a reservoir equipped with a vacuum system for drawing fluids from the reservoir (Figure 10, vacuum system 86, tube 84; Column 17, lines 63-66) Such a vacuum could remove either specimens or electrophoretic medium from the reservoir.

It would have been obvious to one having ordinary skill in the art at the time of the invention to modify the invention of Adourian et al by adding a vacuum mechanism for withdrawing fluids from the reservoirs, as taught by Menchen et al, because it could conserve limited sample volumes or facilitate full automation by cleaning the reservoirs of gel prior to sample injection.

In such a combination, it would also be obvious to control the vacuum mechanism by the same control part as the rest of the apparatus, for ease of operation.

Response to Arguments

21. Applicant's arguments filed on 16 November 2004 have been fully considered but they are not persuasive.

Regarding the rejections under 35 U.S.C. §112, the examiner agrees that claims 9, 10, and 12 are now definite, as amended. However, the language of claim 8 is still unclear. A proposed replacement for the 3rd paragraph of the claim is given above.

Regarding the rejection of claim 3 under 35 U.S.C. § 103(a) as being obvious over Adourian et al in view of Smith et al, Applicants argue that the amendment distinguishes the claim above Adourian et al and Smith et al by including further limitations to an electrophoretic member holding part, a temperature regulation mechanism, and an electrophoretic chamber lid, with the detecting part positioned above the chamber lid and the light being detected through the opening of the chamber lid. (Amendment pages 12-13) As described in the rejection above, Adourian et al disclose the holding part, temperature regulation mechanism, lid, and light traveling through the hole in the lid. Regarding the placement of the detecting part, the examiner submits that this is a matter of design choice, well within the abilities of one having ordinary skill in the art, particularly considering the isotropic nature of fluorescence emission. In the amendment, Applicants also argue the differences between their heating element and that disclosed by Adourian et al. (Page 13, 2nd and 3rd full

paragraphs) These differences are not reflected in the language of the claim, and thus cannot be considered in determining patentability.

Regarding the rejection of claim 5 under 35 U.S.C. §103(a) as being obvious over Adourian et al in view of Smith et al and Birnbaum et al, Applicants arguments have been considered, but are moot in view of the new grounds of rejection presented above.

Regarding the rejection of claims 8 and 9 under 35 U.S.C. §103(a) as being obvious over Adourian et al in view of Smith et al, Birnbaum et al, and Uchigaki et al, since these claims depend from claim 5, the arguments are moot in view of the new grounds of rejection presented above. Specific to the application of Uchigaki et al, Applicant argues that this reference does not disclose the claimed control steps, and that the steps taken by Uchigaki et al would not be readily adaptable to Adourian et al or Smith et al. (Amendment, Page 14, 3rd paragraph) The examiner submits that the Applicants are not claiming any particular control steps, and that in the case of detected operational abnormalities, it would be obvious to discontinue device operation, which was the subject of the disclosure of Uchigaki et al that was relied upon.

Regarding the rejection of claim 10 under 35 U.S.C. §102(e) as being anticipated by Adourian et al, Applicants argue that limiting the claim to simultaneous buffer injection distinguishes the claim from prior art, and the function of this in mitigating water head difference supports this. The claim language does not reflect any considerations of the water head difference, and accordingly this cannot be taken into consideration in

determining patentability. Furthermore, Adourian et al disclose simultaneous liquid transfer in their system, including buffers, as described above.

Conclusion

22. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.


23. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Jeffrey Barton, whose telephone number is (571) 272-1307. The examiner can normally be reached Monday-Friday from 8:30 am – 5:00 pm.

Art Unit: 1753

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen, can be reached at (571) 272-1342. The fax number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at (866) 217-9197 (toll-free).

JTB
January 19, 2005


NAM NGUYEN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700